REMARKS

In the Action, Claims 1 and 2 were rejected under 35 U.S.C. 103(a) as being unpatentable over Sakai et al. (US 6,377,899) in view of Kallet (3,740,147). Claims 3 and 4 were rejected under 35 U.S.C. 103(a) as being unpatentable over Sakai et al. (US 6,377,899) in view of Kallet (3,740,147), and further in view of Fujita (JP 10-241567).

In view of the rejections, claims 1 and 4 have been amended to clarify the features of the invention. New claims 5-8 have been added to include additional features of the invention disclosed in the specification.

As cited in claim 1, a spectrophotometer of the invention includes a light source including a detection lamp for irradiating light having a first bright line and a predetermined wavelength region, and a wavelength check lamp for irradiating light having a second bright line in the predetermined wavelength region; an optical system for guiding the light from the light source to a detection position and providing a zero-order light by the detection lamp; a light detecting section for detecting the light from the light source passing through the detection position; a spectral element provided on one of an optical path between the light source and the detection position and an optical path between the detection position and the light detecting section; a spectral element driving mechanism connected to the spectral element for changing an angle of the spectral element; and a reference position detecting section.

The reference position detecting section is provided for detecting a first reference position of the spectral element where the first bright line of the light from the detection lamp is ejected on the detection position, a second reference position of the spectral element where the second bright line of the light from the wavelength check lamp is ejected on the detection position, and a third reference position of the spectral element where as the zero-order light, the detection lamp is ejected on the detection position.

The reference position detecting section controls the light

source to turn on only the wavelength check lamp to detect the second reference position when the spectrophotometer is turned on. Further, the reference position detecting section controls the light source to turn on only the detection lamp to detect the first and third reference positions after the second reference position is detected. Accordingly, only the wavelength check lamp is turned on when the spectrophotometer is turned on. After the second reference position is detected, only the detection lamp is turned on.

Incidentally, the zero-order light is obtained by setting the angle of the spectral element. Namely, in case an angle of the spectral element is set for the light from the detection lamp, the zero-order light is obtained.

In Sakai et al., a method of calibrating a spectrophotometer is disclosed. As shown in Fig. 1 in Sakai et al., the spectrophotometer is provided with several lamps 1a of different kinds set in a light source 1 such that light emitted from a selected one of these lamps 1a is introduced into a monochromator 2. In a process of the calibration shown in Fig. 2, a specific wavelength interval is obtained, and a lamp having a bright line with a wavelength interval smaller than the specific wavelength interval is selected as the light source. After one or more lamps are thus selected, the selected lamp or lamps are installed in the light source part. When a plurality of lamps is selected, a control unit 9 controls the light source 1 to switch on one of the lamps, and then another of the lamps.

In the invention, the light source includes the two specific types of lamps, namely the detection lamp and the wavelength check. The detection lamp irradiates the zero-order light, first bright line, and predetermined wavelength region. The wavelength check lamp irradiates the light having the second bright line in the predetermined wavelength region. In Sakai et al., the specific wavelength interval is obtained, and a lamp having a bright line with a wavelength interval smaller than the specific wavelength interval is selected as the light source. After one or more lamps are thus selected, the selected lamp or lamps are installed in the

light source part. Accordingly, the number of the lamps and the types of lamps are not predetermined and specified in advance.

In the invention, the reference position detecting section detects the three specific reference positions of the spectral element, namely the first, second and third reference positions. In the first reference position, the first bright line of the light from the detection lamp is ejected on the detection position. In the second reference position, the second bright line of the light from the wavelength check lamp is ejected on the detection position. In the third reference position, as the zero-order light, the detection lamp is ejected on the detection position. In Sakai et al., the specific wavelength interval is obtained, and a lamp having a bright line with a wavelength interval smaller than the specific wavelength interval is selected as the light source. The calibration is conducted based on the bright line. Accordingly, the reference position is not specified and predetermined in advance.

In the invention, the two lamps are turned on in a predetermined specific sequence. Namely, the wavelength check lamp is turned on when the spectrophotometer is turned on, and after the second reference position is detected, the detection lamp is turned on. In Sakai et al., the specific wavelength interval is obtained, and a lamp having a bright line with a wavelength interval smaller than the specific wavelength interval is selected as the light source. When a plurality of lamps is selected, the control unit 9 controls the light source 1 to switch on one of the lamps, and then another of the lamps. There is no disclosure or suggestion that the lamps are turned on in a specific order. Sakai does not disclose or suggest the features of the invention.

Kallet discloses a microspectrophotometer having a microscope and a spectrum analyzer. In the microspectrophotometer shown in Fig.1 of Kallet, light from a light source 45 is separated through a beam splitter 7, and is irradiated toward a spectrum analyzer 18 through a lens 14. The light is reflected from a mirror 26 to a grating 24, and then is reflected from a mirror 28 to a detector 48. Drive means 64 is employed to cyclically oscillate the grating

24.

In the invention, the light source includes the two specific types of lamps, namely the detection lamp and the wavelength check lump. The detection lamp irradiates the light having the predetermined wavelength region and first bright line. Also, the zero-order light is obtained from the detection lamp. The wavelength check lamp irradiates the light having the second bright line in the predetermined wavelength region. These features as well as the checking of the positions of the lights of the invention are not disclosed or suggested in Kallet. Kallet simply discloses the general spectrophotometer.

Fujita discloses a high-speed liquid chromatograph. As shown in Fig. 1 of Fujita, the liquid chromatograph is provided with a see-through deuterium lamp 11, a low-pressure mercury lamp 8, a diffraction lattice 4, a flow cell 6, and a photometer 7. The see-through deuterium lamp 11 and the low-pressure mercury lamp 8 are switched according to a mode of measurement.

In the invention, the reference position detecting section is provided for detecting a first reference position of the spectral element where the first bright line of the light from the detection lamp is ejected on the detection position, a second reference position of the spectral element where the second bright line of the light from the wavelength check lamp is ejected on the detection position, and a third reference position where as the zero-light, the detection lamp is ejected on the detection position. Fujita does not disclose the reference position detecting section having the function described above.

As explained above, the cited references do not disclose or suggest the features of the invention. Even if the cited references are combined, the present invention is not obvious from the cited references. The invention is patentable over Sakai et al. in view of Kallet and Fujita.

Reconsideration and allowance are earnestly solicited.

Respectfully submitted,

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